

REMARKS

Claims 1 to 15, as amended, appear in this application for the Examiner's review and consideration. Claim 16 is canceled by this amendment without prejudice to Applicants' rights to file one or more continuation or divisional applications directed to the subject matter of that claims. The amendments are fully supported by the specification and claims as originally filed. In particular, support for the amendments of the claims to recite "wherein any solid added to the molten silicon is not a chloride that generates a chloride containing gas when added to molten silicon" is found in the present specification at page 6, lines 21 to 25, and page 8, lines 11 to 15 and 20 to 22, where the present specification clearly distinguishes the presently claimed method from the method disclosed in International Publication No. WO 89/02415, which incorporates chlorides. Therefore, there is no issue of new matter.

Applicants acknowledge with appreciation the courtesies shown to their representative, Alan P. Force (Reg. No. 39,673), in a telephone interview on September 21, 2010, by Examiner Stefanie Cohen and her supervisor, Supervisory Patent Examiner Melvin Mayes. The arguments set forth herein are in accordance with that interview.

Applicants note that during the interview, Examiner Mayes stated that the Amendments to the claims required further search and consideration, as the claims have been narrowed to exclude chloride containing solids from the solids added to the molten silicon in the method of the invention. In particular, Examiner stated that the original search was for methods of removing boron from silicon comprising adding a solid comprising silicon dioxide and a solid comprising one or both of a carbonate of an alkali metal or a hydrate of a carbonate of an alkali metal to molten silicon.

According to the Examiner, as the amended claims recite "wherein any solid added to the molten silicon is not a chloride that generates a chloride containing gas when added to molten silicon," a new search is required for methods of removing boron from silicon comprising adding a solid comprising silicon dioxide and a solid comprising one or both of a carbonate of an alkali metal or a hydrate of a carbonate of an alkali metal to molten silicon, where the solid added to the molten silicon is not a chloride that generates a chloride containing gas when added to molten silicon.

In response, Applicants respectfully submit that the proposed new search is merely a subset of the original search. Any search directed to methods of removing boron from silicon comprising adding a solid comprising silicon dioxide and a solid comprising one or both of a carbonate of an alkali metal or a hydrate of a carbonate of an alkali metal to molten silicon is

inherently a search for methods of removing boron from silicon comprising adding a solid comprising silicon dioxide and a solid comprising one or both of a carbonate of an alkali metal or a hydrate of a carbonate of an alkali metal to molten silicon where the solid added to the molten silicon is not a chloride that generates a chloride containing gas when added to molten silicon.

Accordingly, a new search is not required.

Claims 1 to 15 stand rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over International Publication No. WO 89/02415 to Mellström et al. (Mellström), for the reasons set forth on pages 2 to 5 of the Office Action.

In the Response to the Arguments section, the Final Office Action states that the arguments of the Amendment dated April 23, 2010, were not persuasive, as:

Applicant argues Mellstrom uses a chloride compound in the method and further argues the "consisting essentially of" overcomes the use of the chloride. However, the claim merely says adding a solid consisting essentially of silica and a solid consisting essentially of a carbonate. ... This does not exclude another solid consisting essentially of chloride also being added. As claimed, the solids added to the molten silicon during the "adding" step are not limited to only silicon dioxide and one or both of a carbonate or a hydrate of a carbonate.

In response, Applicants submit that the present claims, as amended, are directed to a method for removing boron from silicon. The presently claimed method comprises heating metal silicon containing boron as an impurity to a temperature ranging from the melting point of silicon to 2200°C to place it in a molten state. A solid comprising silicon dioxide and a solid comprising one or both of a carbonate of an alkali metal or a hydrate of a carbonate of an alkali metal are then added to the molten silicon to form a slag containing boron on the molten silicon and remove the boron from the silicon. Any solid added to the molten silicon is not a chloride that generates a chloride containing gas when added to molten silicon.

In contrast to the presently claimed method, Mellström discloses slag forming components containing solid chlorine compounds. *See* Mellström, page 2, lines 8 to 15, and the Abstract. As will be understood by one of ordinary skill in the art, the chloride compounds disclosed by Mellström, e.g., chlorides of alkali and/or alkaline earth metals, are of the type that will produce a chloride containing gas when added to molten silicon.

In contrast, the present claims, as amended, recite that any solid added to the molten silicon is not a chloride that generates a chloride containing gas when added to molten silicon. In addition, the present specification specifically distinguishes the presently claimed

method from the disclosure of Mellström. *See* the present specification, page 6, lines 21 to 25, and page 8, lines 11 to 15 and 20 to 22. Thus, the addition of slag forming components comprising solid chlorine compounds, as disclosed by Mellström, are excluded from the present claims.

In addition, the presently claimed method provides unexpected results when compared to Mellström. In particular, the examples provided in the present specification demonstrate that the presently claimed method provides a significantly more purified silicon than does the process disclosed by Mellström. For example, the boron, B, content of the silicon produced in Example 2 of the present specification is 0.06 ppm. *See*, the present specification, page 24, lines 32 to 34. In contrast, the lowest boron content for “purified” silicon disclosed in the examples of Mellström is 5 ppm. *See* Mellström, page 4, lines 14 and 15.

Therefore, Mellström does not disclose or suggest the presently claimed method, and fails to provide any reason for one of ordinary skill in the art to make and/or use the presently claimed method.

Therefore, as Mellström provides no reason for one of ordinary skill in the art to make and/or use the presently claimed method, the present claims are not obvious over those references. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 1 to 15 under 35 U.S.C. § 103(a) over Mellström.

Claim 16 stands rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over Mellström in view of Hurley et al., *THE EFFECTS OF ATMOSPHERE AND ADDITIVES ON COAL SLAG VISCOSITY*, (Hurley), for the reasons set forth on page 5 of the Office Action.

In response, Applicants submit that claim 16 has been canceled without prejudice, mooted the rejection of that claim. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claim 16 under 35 U.S.C. § 103(a) over Mellström in view of Hurley.

Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants’ position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

No fee is believed to be due for the filing of this Amendment. Should any fees be due, however, please charge such fees to Deposit Account No. 11-0600.

Respectfully submitted,

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